A technical manual from the experts in *Business-Critical Continuity™*

NetSure™ A50B50 DC Power Retrofit

Method of Procedure - NetSure™ A50B50 DC Power Retrofit

MOP588250400SK003 (Issue AA, January 29, 2014)

SPEC. NO.: 588250400SK003
KIT, A50B50 RETROFIT, MAIN, FLOODED BATTERIES

SPEC. NO.: 588250300SK001
KIT, A50B50 RETROFIT, EXPANSION

EMERSON
Network Power

Business-Critical Continuity™, Emerson Network Power, and the Emerson Network Power logo are trademarks and service marks of Emerson Electric Co.

NetSure™, NetSpan™, NetReach™, NetXtend™, and NetPerform™ are trademarks of Emerson Network Power, Energy Systems, North America, Inc.

All other trademarks are the property of their respective owners.

The products covered by this instruction manual are manufactured and/or sold by Emerson Network Power, Energy Systems, North America, Inc.

The information contained in this document is subject to change without notice and may not be suitable for all applications. While every precaution has been taken to ensure the accuracy and completeness of this document, Emerson Network Power, Energy Systems, North America, Inc. assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions. Refer to other local practices or building codes as applicable for the correct methods, tools, and materials to be used in performing procedures not specifically described in this document.

This document is the property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

Copyright © 2014, Emerson Network Power, Energy Systems, North America, Inc.
All rights reserved throughout the world.

TABLE OF CONTENTS

DOCUMENT SET 1
DESCRIPTION 2
TOOLS REQUIRED 4
INSTALLATION 4
- Mounting 4
- Electrical Connections 8
- Installing the Controller 11
- Installing the Rectifier 12
- Re-installing the Front Cover Panel(s) 14

INITIALLY STARTING, CONFIGURING, AND CHECKING SYSTEM OPERATION 15
- Initial Startup Preparation 15
- Initially Starting the System 15
- SCU+ Initialization 15

CHECKING SYSTEM STATUS 16
CHECKING SYSTEM OPERATION 17
REVISION RECORD 18

DOCUMENT SET

The following documents are provided with your system.

System User Manual:	UM588250400/UM588250300
System Application Guide:	SAG588250400/SAG588250300
SCU+ Controller Instructions:	UM1M521BNA
SCU+ Configuration Drawing:	C553923
Rectifier Instructions:	UM1R483500E
Schematic Diagram:	SD588250400/SD588250300
Wiring Diagram:	T588250400/T588250300

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

DESCRIPTION

NetSure A50B50 DC Power Retrofit is a power solution comprising one or more frames that allow new-generation NetSure rectifiers to be installed in the -48V Modular Power Series rectifier shelves that house the older model A50B50 rectifiers. The new rectifiers can operate with or without the original rectifiers in the same system and the same shelf.

The A50IFRM Intelligent Frame contains a CAN Interface assembly and IB2 assembly. It accommodates a Rectifier Module and a Controller Unit. The A50EFRM Expansion Frame contains a CAN Interface assembly and accommodates a Rectifier Module. One Intelligent Frame is required per power system. The Controller Unit is set up with a special configuration for each application, configuration number 553923 for flooded batteries.

This document details the installation practice for the 588250400SK003 Main Retrofit Kit for Flooded Batteries and 588250300SK001 Expansion Retrofit Kit. The materials included with each kit are listed here:

TABLE 1: MOP588250400SK0003 Kit, A50B50 Retrofit, Main, Flooded Batteries

QTY	EMERSON #	DESCRIPTION	CLEI CODE	ECI NUMBER	CPR CODE
1	588250400	A50B50 Retrofit, Main Frame	PBM9200BRA	463160	214871
1	1R483500E	Rectifier, 48V, 3500W, Hi Eff	PBP4ABXAAB	182761	070YZP
1	1M521BNAZZ025	Controller, SCU+	PBC2AALEAA	172769	070XAE

TABLE 2: MOP588250300SK001 Kit, A50B50 Retrofit, Expansion

QTY	EMERSON #	DESCRIPTION	CLEI CODE	ECI NUMBER	CPR CODE
1	588250300	A50B50 Retrofit, Main Frame	PBM9300BRA	463161	214872
1	1R483500E	Rectifier, 48V, 3500W, Hi Eff	PBP4ABXAAB	182761	070YZP

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

Prior to performing this procedure, contact AT&T Access Network Reliability Center at 877-363-2490, option 4 and request an alarm log be established for the cabinet being upgraded.

*All personnel performing this procedure MUST read and answer the questions in **TABLE 3** to ensure these situations are considered prior to starting work or making any network changes.*

NOTICE

If the answer to any of the questions below is a NO then STOP and contact your manager!

TABLE 3: Questions to Ask Yourself

Ask Yourself	YES	NO	N/A	Comments
1. Do I have the proper and appropriate building access and permissions for the environment I am about to enter?	☐	☐	☐	
2. Do I know why this work is being performed?	☐	☐	☐	
3. Have I identified and notified everybody - customers and internal groups who will be directly affected by this work?	☐	☐	☐	
4. Can I prevent or control service interruptions?	☐	☐	☐	
5. Is this the right time to do this work?	☐	☐	☐	
6. Am I trained and qualified to perform this work?	☐	☐	☐	
7. Are the MOP and supporting documents current and error free?	☐	☐	☐	
8. Is everything in place to allow me to quickly and safely restore service if something does go wrong?	☐	☐	☐	
9. Have I walked through this procedure and do I know which network elements I am impacting with this procedure?	☐	☐	☐	
10. Have I made sure this procedure contains proper closure including obtaining clearance and release from the appropriate work center?	☐	☐	☐	
E911/911	**YES**	**NO**	**N/A**	**Comments**
1. Do I know how this work could impact 911/E911?	☐	☐	☐	
2. Do I know what 911/E911 phase is required?	☐	☐	☐	
3. Have I identified potential risks to 911/E911 and taken all measures to minimize them?	☐	☐	☐	
4. Does this work affect 15+ sites?	☐	☐	☐	

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

TABLE 3: Questions to Ask Yourself				
5. Can I prevent or control service interruption to 911/E911?	☐	☐	☐	
6. Is it the right time to do this work?	☐	☐	☐	
7. Is the individual performing the work trained and qualified to do this work?	☐	☐	☐	
8. Are MOPS and supporting documents current and error free?	☐	☐	☐	
9. Does the MOP include a 911/E911 test plan?	☐	☐	☐	

TOOLS REQUIRED

The following tools are required for installation:

Philips Screwdriver, medium

Flat Screwdriver, small

INSTALLATION

Mounting

The A50IFRM Intelligent Frame and A50EFRM Expansion Frame are designed to mount inside A50B50-based rectifier shelves.

Ensure that all AC input and DC output connections to the shelf are intact. No changes or adjustments are required for these connections when installing the A50B50 Retrofit Solution. All wirings and grounding should follow the current edition of the National Electrical Code and applicable local codes. Follow the procedure below.

Procedure

1) Remove the front cover panel from the A50IFRM (588250400) frame, as shown in Figure 1. Set aside hardware for later use.

A four position switch (S1) is provided which selects what type of signal is provided to J8 pin 12 (or TB2 pin 1) of A50B50 cabinet during a rectifier fail alarm condition - either one of three available resistive ground signals, or a ground (+BAT) signal. Switch S1 is located on CAN Interface board (see Figure 2) in A50IFRM. Refer to Table 4 , and adjust switch S1 per requirements of the specific installation. Refer to Table 5 for resistance values of the three groups.

If applicable, Switch off the DC output breaker and then the AC input breaker of the A50B50 rectifier in the left-most slot of the existing rectifier shelf. Remove the unit by loosening the four screws at the corners of the rectifier and then pulling on the handle. Set the unit aside.

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

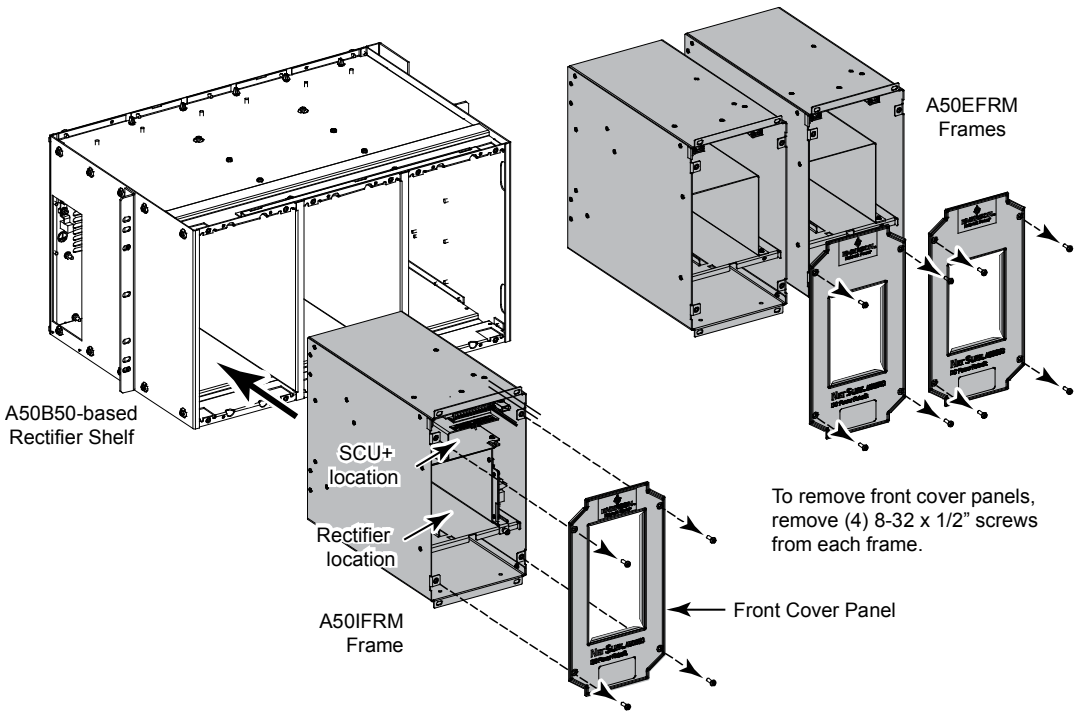


Figure 1
Installing A50IFRM Intelligent Frame and
A50EFRM Expansion Frame into the Existing Shelf

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

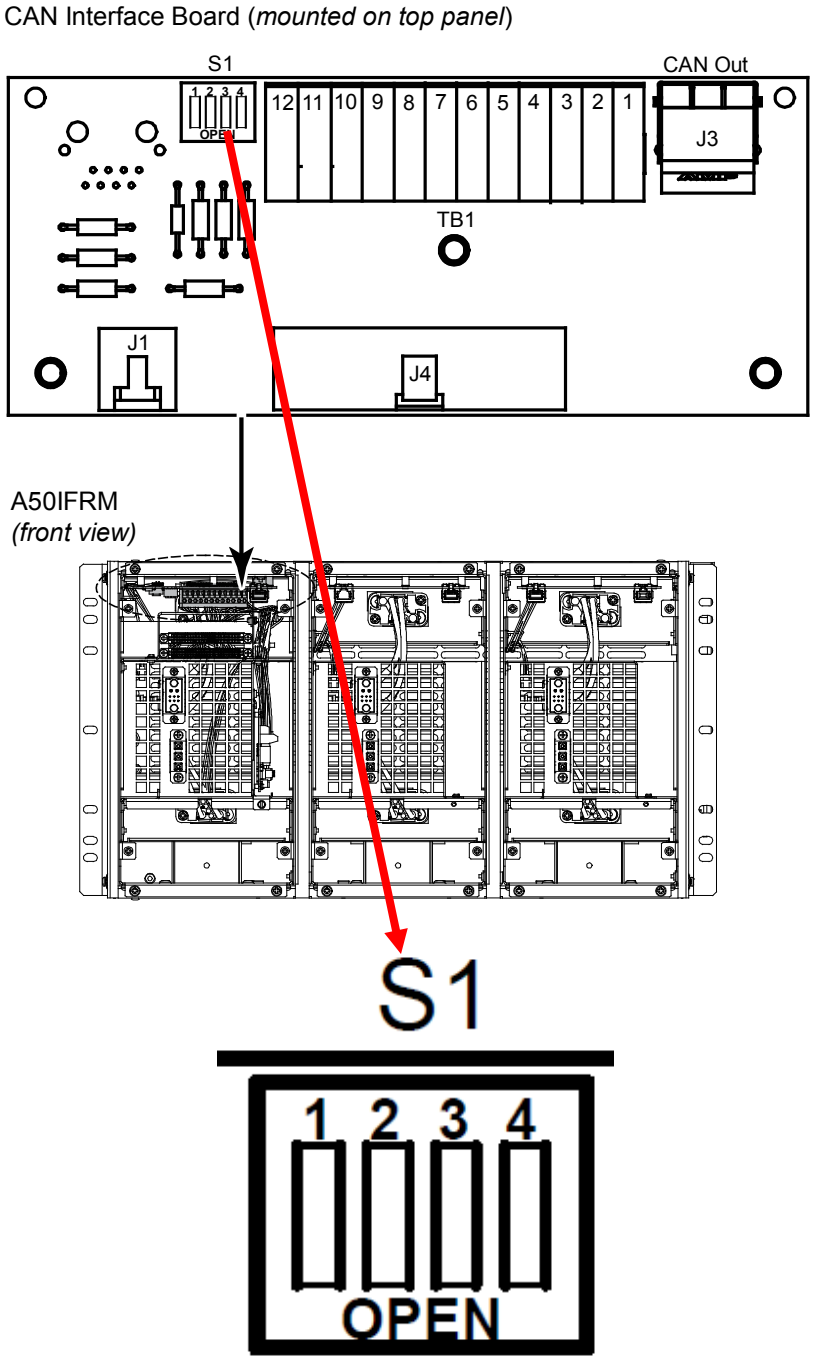


Figure 2
CAN Interface Board Connections

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

Resistance Values of Group (See Table 5)	Switch S1 Settings		Settings Capable with Alarm and Control Panel(s), Part No(s).
	Switch Position	Open/ Close	
1	1	Open	437422100 437422800 437423000 437423100
	2	Open	
	3	Open	
	4	Closed	
2	1	Open	437420600, 437420700, 437420800, 437420900, 437421600, 437421900, 437422300, 437423300, 437423400
	2	Open	
	3	Closed	
	4	Open	
3	1	Open	437417400
	2	Closed	
	3	Open	
	4	Open	
Ground (+BAT) Signal Provided	1	Closed	--
	2	Open	
	3	Open	
	4	Open	

Table 4
Switch S1 Settings

No. of Failed Modules	Alarm Resistance Value (Ohms) Group 1	Alarm Resistance Value (Ohms) Group 2	Alarm Resistance Value (Ohms) Group 3
1	27.4K	41.2K	10K
2 or more	7.3K	8K	5K

Table 5
Three Groups of Resistance Values

2) Slide the A50IFRM into the first slot in the rectifier shelf.
3) Using the hardware supplied, secure the frame to the shelf. Refer to Figure 3.
4) Do **not** install the front cover panel on the frame at this time.
5) Repeat the same steps for the rest of the frames.

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

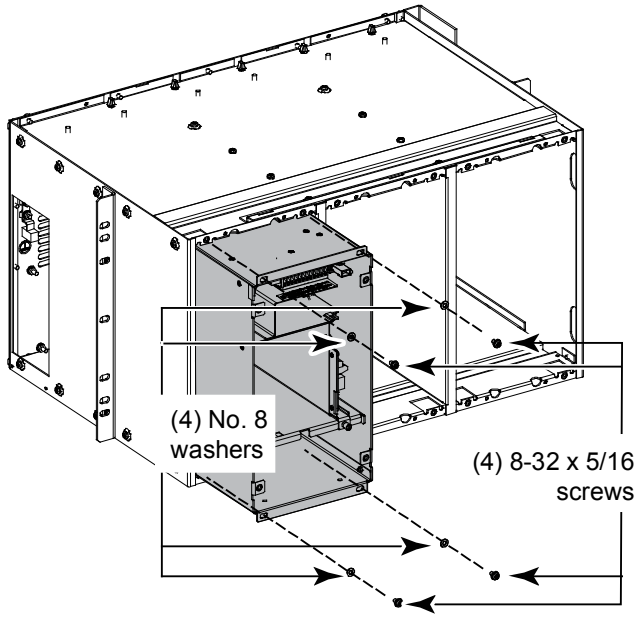


Figure 3
Securing the Frame to the Shelf

Electrical Connections

WIRING CONSIDERATIONS

The AC input, DC output, and system alarm connections on the frame mate with the existing connectors in the shelf. No adjustments or alterations are required for these connections.

MAKING CAN CONNECTIONS

CAN connections are made to allow expansion frames (A50EFRM) to connect to the main frame (A50IFRM) for rectifier control and alarming. Follow the procedure below.

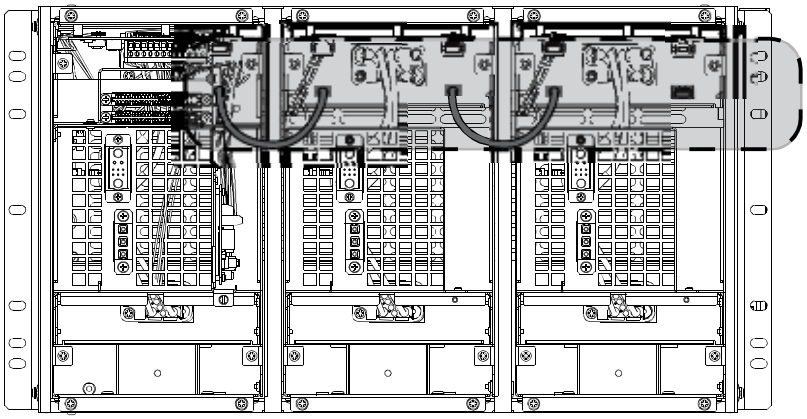
Note: *If only one frame (A50IFRM) is used for application, install the furnished CAN bus termination plug (P/N 547678) to terminate the bus. This terminator is inserted into the socket at the upper right side of the frame. Refer to Figure 4 for details.*

Single Shelf

1) To connect adjacent frames in one existing shelf, use the 6-in long P/N 548451 CAN cable for each connection. Refer to Figure 4 for a sample configuration of (1) A50IFRM and (2) A50EFRMs.

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

Single Shelf CAN Connection



DETAILS

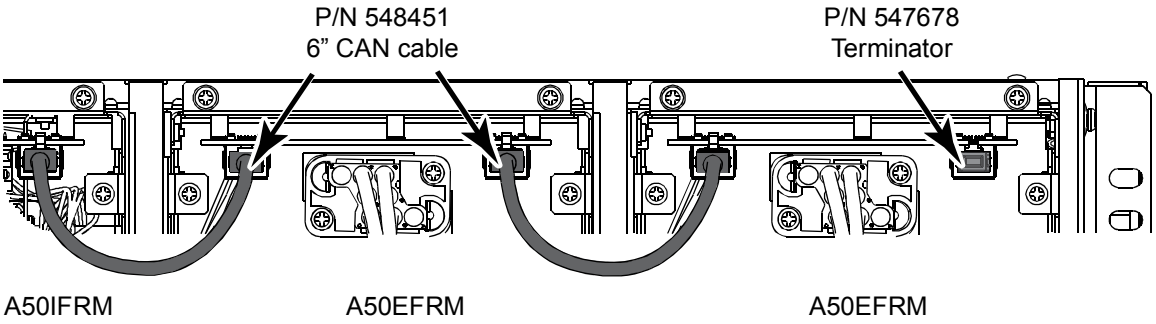


Figure 4
CAN Connections in a Single Shelf

2) To terminate the bus, plug the furnished termination plug (P/N 547678) into the right-hand CAN port of the last frame.

3) For CAN connections with only one A50IFRM and one A50EFRM, insert the termination plug into the right-hand CAN port of the A50EFRM.

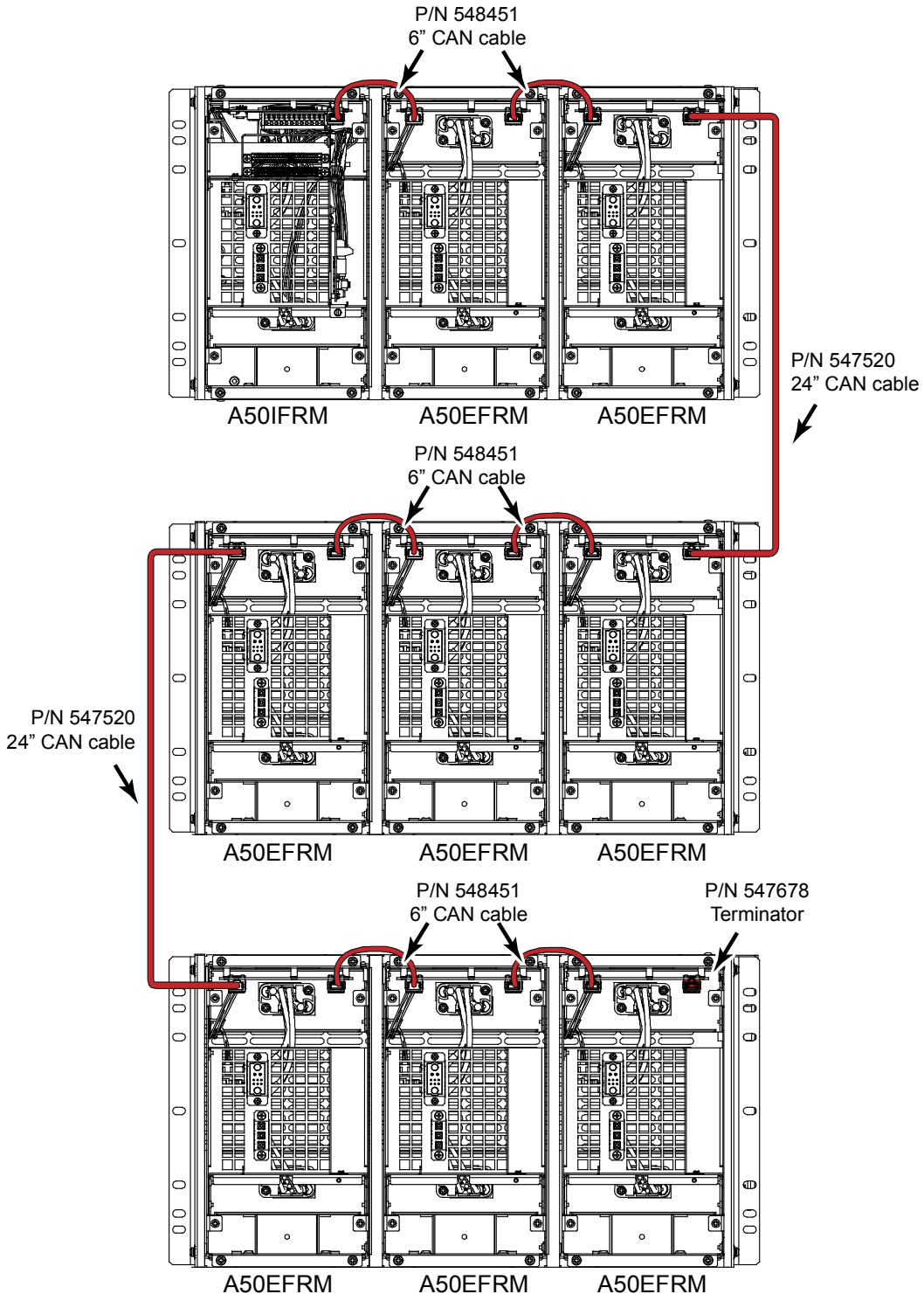
Multiple Shelves

1) To connect frames installed in different shelves, use the 24-in long CAN cable (P/N 547520) to provide a longer wiring distance. Refer to Figure 5 for a typical configuration of (1) A50IFRM and (8) A50EFRMs.

Note: *Figure 5 shows one way to make CAN bus connections between retrofit frames in systems with multiple shelves. You can use the supplied cables in any way that best fits your application. The only requirements are that all retrofit frames in the system must be connected in series (in any order) and the termination plug must be installed in the last available port.*

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

Multiple Shelves CAN Connection



Note: *Excess wire can be tucked behind the front covers. The wires can exit each frame at the appropriate corner to minimize the length of exposed wire between frames.*

Figure 5
CAN Connections in Multiple Shelves

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

2) Similar to single shelf configuration of terminating the connection, use P/N 547678 CAN terminator/jumper and plug into the upper right CAT-5 socket of the last frame used.

3) When all CAN connections are made, the front covers can be mounted back on all frames.

Installing the Controller

The SCU+ has its connectors on its rear panel. The SCU+ Controller has a latch which has a handle. When the handle is opened, the latch retracts. When the handle is closed, the latch protrudes. Follow the procedure detailed below. Refer to Figure 6.

The Controller is hot swappable. It can be installed or removed with the system operating.

Procedure

1) Loosen the captive screw on the latch handle if necessary, and open the handle. Refer to Figure 6-A.

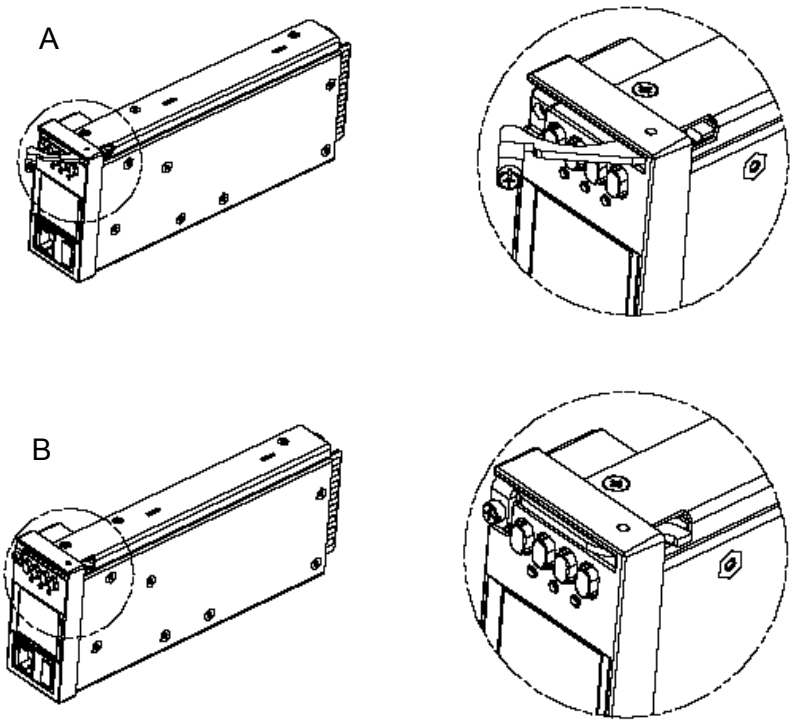


Figure 6
Latch Mechanism of SCU+ Controller

2) Insert the Controller into the A50IFRM. Refer to Figure 7.

3) Close the latch handle. The latch will lock the Controller into frame. Refer to Figure 6-B.

4) Tighten the screw on the latch handle.

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

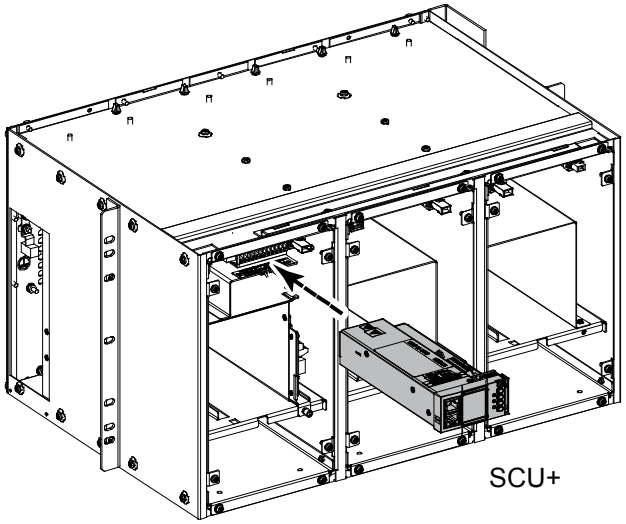


Figure 7
Inserting the Controller into the A50IFRM

Installing the Rectifier

To install a Rectifier Module in a mounting frame, follow the procedure detailed below.

The Rectifier Module is hot swappable. It can be installed or removed with the system operating.

Procedure

1) Place the Rectifier Module into an unoccupied mounting position without sliding it in completely.

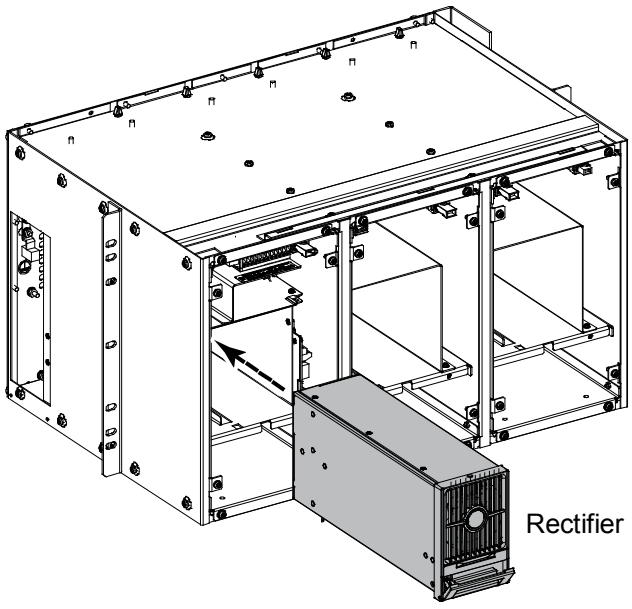


Figure 8
Installing the Rectifier

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

2) Click the Rectifier Module handle in order to pop it forward out of the Rectifier Module's front panel (this will also retract the latch mechanism located on the underside of the Rectifier Module). See Figure 9.
3) Push the Rectifier Module completely into the shelf.
4) Push the handle into the front panel of the Rectifier Module. This will make the latch lock the Rectifier Module securely to the shelf. See Figure 9.
5) Repeat the above steps for each Rectifier Module being installed in the system.
6) Repeat procedure for the rest of the A50FRM frames.

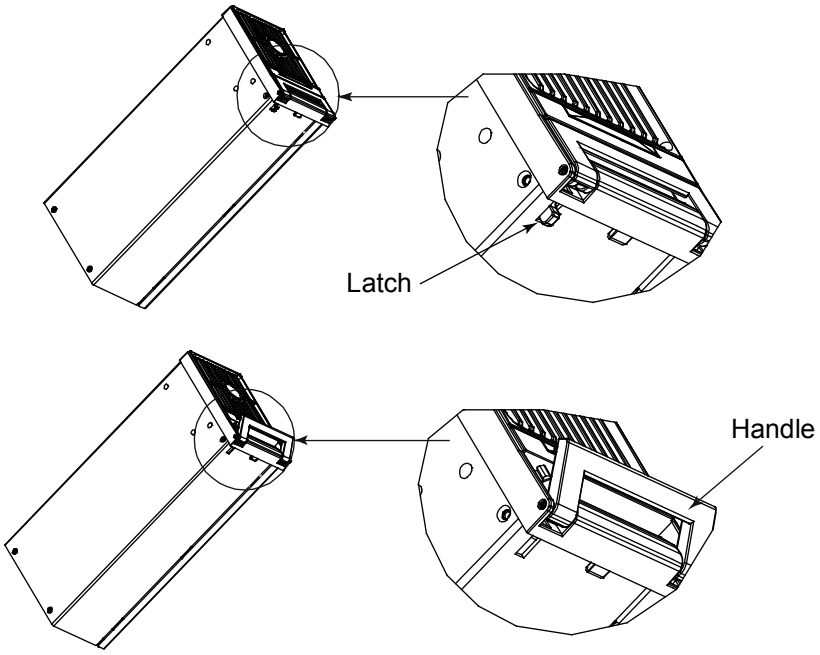


Figure 9
Latch Mechanism on the Rectifier Module

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

Re-installing the Front Cover Panel(s)

After all the wiring is done, the front cover panel should be re-installed into the frame. Secure the front cover panel to the frame using the hardware previously disassembled. Refer to Figure 10.

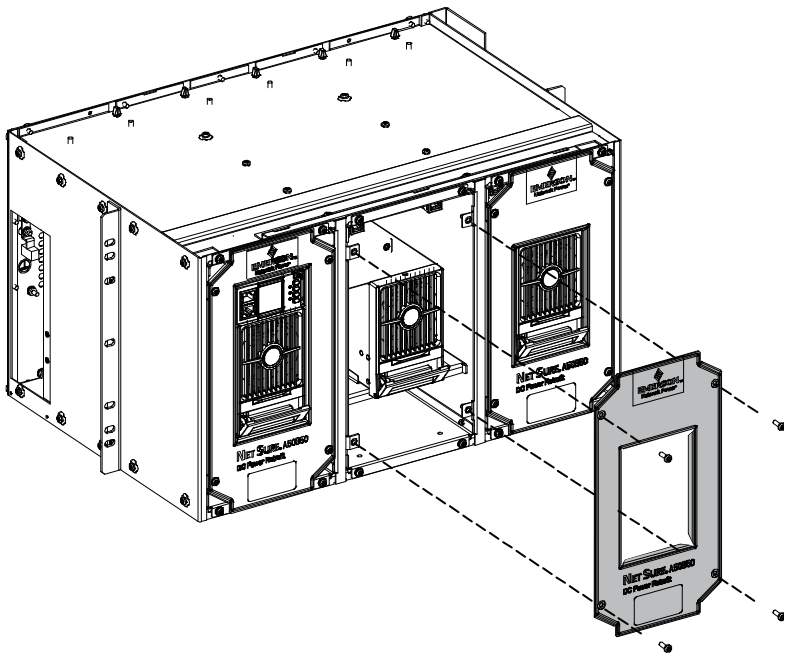


Figure 10
Securing the Front Cover Panel

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

INITIALLY STARTING, CONFIGURING, AND CHECKING SYSTEM OPERATION

Initial Startup Preparation

Ensure that all Rectifier Module mounting positions are filled by a Rectifier Module.

Initially Starting the System

1) Apply DC power to the system by closing the external DC disconnect(s) or protective device(s) that supplies battery power to the system, if furnished.
2) Apply AC input power to the system by closing the external AC disconnects or protective devices that supplies power to the shelf(s).

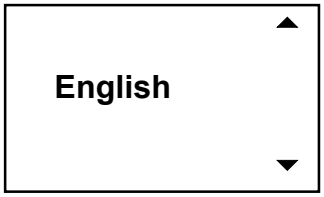
   Note that the system requires multiple AC input branch circuits.

   The rectifiers start and supply power to the loads.

SCU+ Initialization

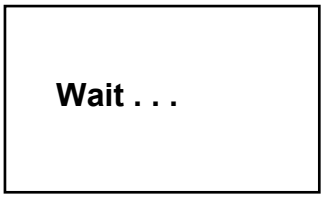
Procedure

1) After the SCU+ is powered on, the language screen appears.



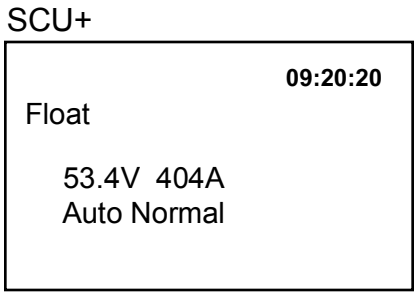
   Press the " ▲ ", or " ▼ " key to select the desired language. Press the **ENT** key to confirm the selection. If no key is pressed within 10 seconds, the SCU+ selects the displayed language automatically.

2) The SCU+ displays 'Wait . . .' as it performs an initialization routine. The SCU+ was pre-programmed for your specific system. These settings determine the initial configuration of the SCU parameters such as output voltage and alarm levels.

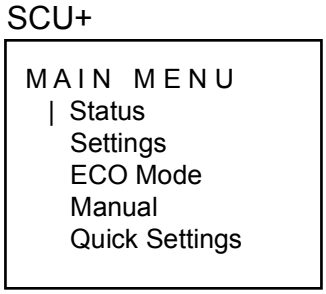


This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

3) Once initialized, the Main screen is displayed.



4) From the Main screen, press **ENT** to go to the "Main Menu" screen.



5) Verify that there are no alarms present on the SCU+ local display. Refer to the *Separate Controller User Manual* (UM521BNA or UM820BNA) for SCU+ local menu operating instructions.

CHECKING SYSTEM STATUS

Observe the status of the indicators located on the Rectifier Modules and Controller. If the system is operating normally, the status of these is as shown in

Table 6.

Component	Indicator	Normal State
Rectifier Modules	Power (Green)	On
	Protection (Yellow)	Off
	Alarm (Red)	Off
SCU+ (if furnished)	Status (Green)	On
	Observation (Yellow)	Off
	Major or Minor Alarm (Red)	Off

Table 6
Status and Alarm Indicators

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

CHECKING SYSTEM OPERATION

The SCU+ has been pre-programmed with the required set points and configuration for this application. No adjustments are required. Refer to the SCU+ Controller User Manual (UM521BNA) for operation of the controller and navigation instructions of the controller menu and web pages.

Check rectifier alarm. Pull one of the NetSure rectifiers from its frame and verify that the original system level alarm panel registers a Rectifier Alarm. Re-install the rectifier.

If no alarms are present, contact the Network Operation Center (NOC) that the work has been completed and the alarm log for this site can be closed. If alarms are present, contact the Emerson Technical Support desk. Contact information is located near the end of this document under NetPerform Optimization Services, Technical Support.

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

REVISION RECORD

Issue	Change Number (ECO)	Description of Change
AA	LLP219953	New

This document is property of Emerson Network Power, Energy Systems, North America, Inc. and contains confidential and proprietary information owned by Emerson Network Power, Energy Systems, North America, Inc. Any copying, use, or disclosure of it without the written permission of Emerson Network Power, Energy Systems, North America, Inc. is strictly prohibited.

NetPerform™ Optimization Services

At Emerson Network Power, we understand the importance of reliable equipment – it's critical to both your business and your bottom line. That is why we offer a wide array of services to meet all of your network infrastructure needs.

Technical Support		
Email	DCpower.TAC@Emerson.com OSP.TAC@Emerson.com	Answers technical product and system questions; determines status of warranties and contractual agreements for repair.
Phone	1.800.800.5260	

Services - Design, Deployment & Optimization		
Email	ES.Services@Emerson.com	Provides quotes and bid responses, order placement and scheduling for design, and deployment and optimization services. Download service & maintenance reports online.
Phone	1.800.800.1280, option 7	
FreedomCare	Secure.EmersonNetworkPower.com	

Spare Parts		
Email	DCpower.Spares@Emerson.com OSP.Spares@Emerson.com	Pricing and PO processing of spare parts, including but not limited to breakers, cables, fuses, rectifier fans, misc. breaker and fuse panels, enclosure fans, doors & switches, etc.
Phone	1.800.800.1280, option 5	

DC Power Depot Repair		
Email	DCpower.Repair@Emerson.com	Creates and processes RMAs, determines lead times and pricing, provides repair shipping information and status.
Phone	1.800.800.1280, option 6	

DC Power Product Training		
Email	DCpower.Training@Emerson.com	Requests for quotes, order placement and scheduling.
Phone	1.800.800.1280, option 8	

For More Information

To learn more about service offerings from Emerson Network Power, please contact your sales representative, call 1-800-800-1280 option 7, email ES.Services@Emerson.com or visit www.EmersonNetworkPower.com/EnergySystems.

Emerson (NYSE: EMR), based in St. Louis, Missouri (USA), is a global leader in bringing technology and engineering together to provide innovative solutions for customers in industrial, commercial, and consumer markets through its network power, process management, industrial automation, climate technologies, and tools and storage businesses. For more information, visit: **Emerson.com**.

Emerson Network Power, a business of Emerson (NYSE:EMR), is the global leader in enabling *Business-Critical Continuity™* from grid to chip for telecommunication networks, data centers, health care and industrial facilities. Emerson Network Power provides innovative solutions and expertise in areas including AC and DC power, precision cooling, embedded computing and power, integrated racks and enclosures, power switching and controls, infrastructure management, and connectivity. All solutions are supported globally by local Emerson Network Power service technicians. For more information on Emerson Network Power's full suite of solutions specifically supporting the communications network infrastructure, including NetSpan™, NetReach™ and NetXtend™ outside plant enclosures and equipment, NetSure™ DC power systems, and NetPerform™ Optimization, Design & Deployment services, visit: **EmersonNetworkPower.com/EnergySystems**.

Learn more about Emerson Network Power products and services at: **EmersonNetworkPower.com**.

Emerson Network Power
Energy Systems, North America
4350 Weaver Parkway, Warrenville, IL 60555
Toll Free: 800-800-1280 (USA and Canada)
Telephone: 440-246-6999 **Fax:** 440-246-4876
Web: EmersonNetworkPower.com/EnergySystems
EnergyNet: Secure.EmersonNetworkPower.com

Emerson Network Power.
The global leader in enabling *Business-Critical Continuity™*.

EmersonNetworkPower.com

- AC Power
- Connectivity
- DC Power
- Embedded Computing
- Embedded Power
- Infrastructure Management & Monitoring
- Outside Plant
- Power Switching & Controls
- Precision Cooling
- Racks & Integrated Cabinets
- Services
- Surge Protection